REMARKS

Claims 1–9 and 11-14 are pending in this application. Claim 9 has been amended to incorporate the elements previously set forth in claim 10, which has been cancelled. It is respectfully submitted that this amendment is solely a matter of form and, if an appeal proves necessary, would place the claim in better form for consideration by the Board. Accordingly, it is respectfully submitted that this amendment should be entered pursuant to the provisions of 37 C.F.R. §1.116(b)(2). It is further and respectfully submitted that the amendment to claim 9 is supported by the application as originally filed (including the specification, claims abstract of the invention and drawings) and that no new matter has been added. For the reasons set forth below, the Examiner's rejections are traversed.

Bengoechea et al. Publication

The Examiner rejected all claims under 35 U.S.C. §102(a) and (f) as being anticipated by a publication titled "Effects of confinement on the phase separation in emeraldine base polyaniline cast from 1-methyl-2-pyrrolidinone studied via dielectric spectroscopy," by M. Bengoechea, F. Aliev and N. Pinto (hereinafter "Bengoechea *et al.*") For the reasons that follow as well as those set forth in the enclosed Declaration of

Nicholas J. Pinto, it is respectfully submitted that this reference is not prior art.

The inventors in this application are professors at the University of Puerto Rico. Like many professors, they employ graduate students to conduct experiments at their direction and to draft and revise publications. The publication relied upon by the Examiner, namely Bengoecha *et al.*, is an article that was published by the inventors along with one of their graduate students. Specifically, Profs. Aliev and Pinto invented the subject matter set forth in the claims of this application. Their graduate student, Mr. Manuel R. Bengoechea, assisted in preparing the article cited by the Examiner but did not qualify as an inventor under the U.S. Patent Laws. This is confirmed by the attached Declaration of Nicholas J. Pinto, which is incorporated herein by reference.

Because the article was submitted by the inventors for publication, their date of invention necessarily predated the submission. In other words, Bengoechea *et al.* does not qualify as prior art under 35 U.S.C. §102(a) because it was not published before the invention by the applicants.

Likewise, the inventors are properly named in this application. That Mr. Bengoechea was an author on the publication does not make him an inventor of the subject matter

claimed in this application. Accordingly, the publication does not qualify as prior art under 35 U.S.C. §102(f).

The rejection of the claims based upon Bengoechea *et al.* was first made in the final rejection. The attached Declaration of Nicholas J. Pinto was not earlier presented in this case only because it was not necessary until the Examiner made the final rejection. Accordingly, it is respectfully submitted that the enclosed Declaration of Nicholas J. Pinto should be accepted into the record of this application pursuant to the provisions of 37 C.F.R. §1.116(e).

Background and Prior Art

Applicants' invention teaches a unique method of suppressing microphase segregation of PANiEB. The PANiEB is dissolved in a solution of NMP. The solution is confined in an anapore membrane and the NMP is evaporated. The pores in the anapore membrane suppress segregation of PANiEB into PNB and LEB. By this method conductive films can be formed.

In rejecting the pending claims, the Examiner primarily relied upon U.S. Patent No. 6,753,041 to A. Pron *et al.* (hereinafter "Pron *et al.*"), U.S. Patent No. 5,174,883 to C. Martin *et al.* (hereinafter "Martin *et al.*") and a publication titled "Effect of Solvents and Co-solvents on the Processibility of Polyaniline: I. Solubility and Conductivity studies," by Y.

Cao, *et al.* (hereinafter "Cao *et al.*") Because each of these references teach away from claims in this application, each of these references is addressed briefly in turn.

First, Pron *et al.* teach directly away from the use of NMP as a solvent because the resulting composition becomes insulating. (Col. 3, lines 5-10.) Indeed, the Examiner acknowledges this in the subject Office Action. (Page 6, admitting that "Pron appears to teach away from the use of NMP ... since NMP causes the material to become insulating.") See also the Declaration of Nicholas J. Pinto at ¶ 6. In an attempt to overcome a teaching directly away from the claimed invention, the Examiner turns to Cao *et al.* This reference, however, does not in any way contradict the teaching of Pron et al. In fact, Cao *et al.* supports the teaching of Pron *et al.*

Specifically, the Examiner asserts that Cao *et al.* teach that the "ultimate conductivity of the polyanaline is strongly influenced by addition of co-solvents and counterions with the primary solvent." (Page 6.) To be more accurate, the teachings of Cao *et al.* are summarized in the conclusion (which was cited by the Examiner):

> We show clearly that not only the solubility, but the conductivity of PANI films resulting from these solutions is determined by the interaction of counterion, solvent and co-solvent. Depending on the choice of solvent and co-solvent, the conductivity of films cast from solution can be much higher or much lower than that of the initial PANI powder.

Cao *et al.* disclose the use of a number of solvents and co-solvents in Table 1 at page 188, including NMP. Significantly, the film made with NMP has the strongest insulating properties (10^{-4} S/cm). In other words, consistent with the teachings of Pron *et al.*, Cao *et al.* also "teach away from the use of NMP … since NMP causes the material to become insulating." See also the Declaration of Nicholas J. Pinto at ¶ 7.

In addition, the Examiner asserts that:

> It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Pron *et al.* method by utilizing NMP as the solvent, in combination with at least one co-solvent or counterion (to maintain or increase polyanaline conductivity), as taught by Cao et al., to enhance the solubility of the PANiEB.

This assertion fails for a number of reasons. First, Cao *et al.* teach that solvents other than NMP should be used to obtain higher conductivity and that NMP produces insulating films. As shown in Table 1 at page 188, m-cresol yielded a film with a conductivity of 300 S/cm while NMP yielded an insulating film with a conductivity that is more than a million times lower (10^{-4} S/cm). Accordingly, Cao *et al.* obviously do not teach the use of NMP to obtain a conductive film. Second, applicants' invention teaches that the conductivity is improved by suppressing the formation of PNB and LEB. This is accomplished not by the addition of co-solvents (as taught by Cao *et al.*) but

rather by the use of an anopore membrane. The references relied upon by the Examiner nowhere teach or suggest this aspect of the invention and the Examiner has not contended otherwise.

Instead, the Examiner turns to Martin *et al.* and contends that it would have been obvious to use nucleopore films "to construct a structure having a fast, accurate electrochemical response, and having low capacitive currents (see Martin at column 2, lines 10-17)." What this assertion ignores is that Martin *et al.* is directed to an entirely different method. Martin *et al.* is directed "to electrochemical electrode constructions." See also the Declaration of Nicholas J. Pinto at ¶ 8. In such applications, "a fast, accurate electrochemical response" may be an important consideration, however, the subject invention (as well as Pron *et al.*) do not use electrochemical deposition but instead use evaporation. The Examiner does not identify any teaching in the prior art to suggest that "a fast, accurate electrochemical response" somehow enhances such evaporation.

With this background, the individual claims are addressed in turn.

Independent Claim 1 and Dependent Claims 2-4

Claim 1 recites, among other elements, "dissolving PANIEB in a solution of NMP ... placing the anopore membrane in the

solution of NMP ... and ... evaporating the solution ... wherein the resulting film is formed of PANiEB and wherein the formation of PNB and LEB is suppressed by the anopore membrane." As set forth above, both Pron *et al.* and Cao *et al.* teach away from using NMP as a solvent. These references therefore teach away from applicants' claimed invention.

In addition, the prior art relied upon by the Examiner does not teach or fairly suggest that an anopore membrane would suppress the formation of PNB and LEB. This is an express element of the claim and provides an independent basis for allowance.

Claims 2-4 depend from claim 1 or an intermediate claim. Accordingly, it is respectfully submitted that these claims stand in condition for allowance.

Independent Claim 5 and Dependent Claim 6

Claim 5 recites, among other elements, "dissolving PANiEB in NMP to form a solution; casting a film from the solution by immersing an anopore membrane in the solution ... wherein the cylindrical pores prevent microphase segregation of PANiEB into PNB and LEB." Again, both Pron *et al.* and Cao *et al.* teach away from using NMP as a solvent. These references therefore teach away from applicants' claimed invention.

In addition, the prior art nowhere teaches or fairly suggests that the cylindrical pores of an anopore membrane would suppress the formation of PNB and LEB. This is an express element of the claim and provides an independent basis for allowance.

Claim 6 depends from claim 5 and recites additional elements. Accordingly, it is respectfully submitted that this claim stand in condition for allowance.

Independent Claim 9 and Dependent Claims 11-12 and 14

Amended claim 9 recites, among other elements, "dissolving PANiEB in a solution of NMP; confining the dissolved PANiEB in at least one pore ... wherein the at least one pore suppresses phase separation into PNB and LEB." For the reasons set forth above, it is respectfully submitted that the prior art relied upon by the Examiner teaches away from this claim.

Claims 11 and 12 depend from claim 9 and recite additional elements.

Claim 14 further recites that the microphase suppression is accomplished by "charge pinning." The Examiner's rejection fails to address this express element of claim 14. Accordingly, it is respectfully submitted that the Examiner's rejection fails to establish a *prima facie* case of obviousness and the claim should be allowed.

Claims 7, 8 and 13

The Examiner rejected claims 7, 8 and 13 based upon various combinations of the prior art references discussed above. Because none of the prior art references teach or fairly suggest a PANiEB film where the formation of PNB and LEB have been suppressed, it is respectfully submitted that these claims recite patentable subject matter.

Conclusion

For the forgoing reasons, it is respectfully submitted that the prior art relied upon by the Examiner teaches away from the express elements of the claims. The Examiner's further consideration and favorable action are respectfully requested.

Respectfully Submitted,

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